

# ASPR TRACIE Technical Assistance Request

**Request Receipt Date (by ASPR TRACIE):** 30 November 2022

**Response Date:** 4 January 2023

**Type of TA Request:** Standard

## Request:

The requestor asked for articles and other resources that provide evidence (to healthcare executives) that hospital preparedness conserves financial and other resources. Specifically, the requestor asked for literature: 1) providing evidence that a more prepared hospital (especially for pediatric patients) conserves financial and other resources, and 2) documenting that response to emergencies costs more when hospitals or healthcare systems are less prepared.

## Response:

ASPR TRACIE conducted a search online for resources related to cost benefit or return on investment of healthcare preparedness. Materials gathered are provided in three sections: resources related to hospital benefits resulting from preparedness; resources related to return on investment in healthcare preparedness; and additional resources related to the cost of healthcare preparedness.

### I. Resources Related to Hospital Benefits Resulting from Preparedness

Dan, Y., Tambyah, P., Sim, J., et al. (2009). [Cost-effectiveness Analysis of Hospital Infection Control Response to an Epidemic Respiratory Virus Threat](#). *Emerging Infectious Diseases*. 15(12):1909-16.

The authors used cost data from hospitals in Singapore in a model to assess cost-effectiveness of infection control protocols in response to a respiratory virus epidemic. The model was based on transmission from a single case in the hospital setting and did not assume widespread community transmission. The authors concluded that it was most cost-effective to use a step-up approach to infection control measures, as necessary, based on how an outbreak evolves versus applying very stringent measures at the start of the outbreak and then scaling them back.

Gribben, K., Sayles, H., Roy, S., et al. (2020). [The Crosscutting Benefits of Hospital Emergency Preparedness Investments to Daily Operations: A Hospital Senior Leadership Perspective](#). (NOTE: Refer to attachment for full text article.) *Health Security*. 18(5):409-417.

The authors conducted a cross-sectional study design using a 39-item survey to examine hospital senior leadership perceptions on emergency preparedness investments and the impacts on daily operations. The majority of respondents indicated that drills and exercises, staff training, and updating emergency plans had a positive impact on daily operations. The authors also suggested that hospital surge space use during non-

emergency times may generate revenue and that hospital investments could result in cost-efficient improvements.

Marcozzi, D., Pietrobon, R., Lawler, J., et al. (2020). [Development of a Hospital Medical Surge Preparedness Index Using a National Hospital Survey](#). Health Services and Outcomes Research Methodology. 20:60-83.

The authors describe the development of an index to assess hospital preparedness to respond to a mass casualty incident patient surge. They suggest an objective and standardized index could be used to understand the effects of policy and funding decisions on hospital preparedness.

Puig-Asensio, M., Braun, B., Seaman, A., et al. (2020). [Perceived Benefits and Challenges of Ebola Preparation Among Hospitals in Developed Countries: A Systematic Literature Review](#). Clinical Infectious Diseases. 70(5):976-986.

The authors reviewed studies examining the challenges and benefits developed countries encountered when investing in Ebola preparedness. They found that 60 percent of studies showed benefits of hospital Ebola preparedness, most frequently focusing on training. The authors also could not determine whether investments in Ebola preparedness led to sustained hospital readiness or improved response to future infectious disease threats.

Reed, A. (2022). [Hospitals' Challenge: Money, Staff, Training for Next Crisis](#). Bloomberg Law.

The article offers perspectives from several hospital emergency preparedness experts on the benefits of preparedness activities during past emergencies, the importance of training and exercises, and the lack of accountability and incentives for hospital preparedness investments.

Roy, S., Bekmuratova, S., Medcalf, S., et al. (2020). [Emergency Preparedness: Interviews with Senior Leadership in Nebraska Hospitals](#). (NOTE: Refer to attachment for full text article.) Journal of Emergency Management. 18(5):399-409.

This qualitative study involved interviews with twelve Nebraska hospital leaders about factors influencing investment in emergency preparedness. The authors found that a hospital's geographic location and role in the community along with federal preparedness requirements influenced investment decision-making. They also found that federal funding, leadership commitment, and the hospital's mission contributed to a higher level of emergency preparedness.

Thew, J. (2017). [Ready for Disaster? If Not, It Will Cost You](#). HealthLeaders.

This article features insights from a healthcare system emergency manager about the benefits of investing in preparedness activities.

## II. Resources Related to Return on Investment in Healthcare Preparedness

Center for Global Development. (2022). [What is the Return on Investment of Pandemic Preparedness?](#)

During this moderated discussion, presenters discuss modeling on the return on investment of three outbreak mitigation strategies for four respiratory pathogens that may cause a future pandemic. Models showed preparedness investments leading to 49 to 124 deaths averted per 100,000 depending on the level of investment and that every dollar spent on pandemic preparedness could lead to a \$1,102 economic gain in averted gross domestic product loss and a \$1,703 health gain in averted deaths.

Hendel, S. and d'Arville, A. (2022). [Reimagining Health Preparedness in the Aftermath of COVID-19](#). British Journal of Anaesthesia. 128(2):e100-e103.

This article discusses prioritizing investing in healthcare preparedness to enable resilience of the healthcare system during future disasters.

Organisation for Economic Co-operation and Development. (2022). [Investing in Health Systems to Protect Society and Boost the Economy: Priority Investments and Order-of-Magnitude Cost Estimates](#).

This report identifies six areas to invest in preparedness to strengthen health system resilience: enhancing preventive care; preparing to implement mass population programs (e.g., vaccination, testing); ensuring availability of sufficient core equipment; harnessing the potential of health information; retaining sufficient numbers of health and long-term care professionals; and having a reserve of trained medical staff.

Stryckman, B., Grace, T., Schwarz, P., et al. (2015). [An Economic Analysis and Approach for Health Care Preparedness in a Substate Region](#). (NOTE: Refer to attachment for full text article.) Disaster Medicine and Public Health Preparedness. 9(4):344-348.

The authors conducted a cost-benefit analysis on a regional Pennsylvania response team to assess their level of healthcare preparedness and financial return on investment. They concluded that better preparedness levels had a positive return on investment in this region, and that other communities can estimate their return on investment to make business decisions related to emergency preparedness programs.

Vardavas, C., Nikitara, K., Zisis, K., et al. (2021). [Cost-Effectiveness of Emergency Preparedness Measures in Response to Infectious Respiratory Disease Outbreaks: A Systematic Review and Econometric Analysis](#). BMJ Open. 11(4):e045113.

The authors reviewed studies between 2003 and 2019 that assessed the direct and indirect costs associated with infectious respiratory disease outbreaks. Their cost analysis shows the effectiveness of various interventions to in mitigating or responding to infectious disease outbreaks.

### III. Additional Resources Related to the Cost of Healthcare Preparedness

Barbera, J., Yeatts, D., and Macintyre, A. (2009). [Challenge of Hospital Emergency Preparedness: Analysis and Recommendations](#). (NOTE: Refer to attachment for full text article.) *Disaster Medicine and Public Health Preparedness*. 3 (Suppl 1): S74-S82.

This article addresses how the healthcare industry has taken on a more prominent role in emergency preparedness, which is an integral component of community emergency response. This has in turn resulted in increased funding for hospital preparedness. This article identifies the factors that promote emergency preparedness levels and the challenges that may hinder it.

Clarke, L., Patouillard, E., Mirelman, A., et al. (2022). [The Costs of Improving Health Emergency Preparedness: A Systematic Review and Analysis of Multi-Country Studies](#). *eClinical Medicine*.

The authors reviewed studies that examined the cost of improving health emergency preparedness globally or in at least ten countries meeting certain World Health Organization criteria. They suggested that standardization of methods could improve interpretation and comparison of estimates of investments across countries and studies and greater transparency in reporting study methodologies could support global estimates of resource requirements and investments in pandemic preparedness.

Li, Y., Hsu, E., and Links, J. (2010). [Healthcare System Cost Evaluation of Antiviral Stockpiling for Pandemic Influenza Preparedness](#). (NOTE: Refer to attachment for full text article.) *Biosecurity and Bioterrorism: Biodefense Strategy, Practice and Science*. 8(2): 119-128.

The authors evaluated four antiviral strategies and three purchasing options to determine the most cost-effective approach and challenges related to stockpiling. Overall, they found it most practical for hospitals to acquire antivirals on a large-scale via just-in-time purchase and encourage hospitals to prioritize staff based on their risk for exposure and that impact on continuity of hospital operations.

Fleming, P., O'Donoghue, C., Almirall-Sanchez, A., et al. (2022). [Metrics and Indicators Used to Assess Health System Resilience in Response to Shocks to Health Systems in High Income Countries – A Systematic Review](#). *Health Policy*. 126(12):1195-1205.

The authors reviewed studies examining health system resilience measures following shocks, including COVID-19, economic crises, and other disasters. The authors discuss how health system resilience has been measured and identify challenges in measuring preparedness and understanding how to build health systems that can withstand future shocks.

National Advisory Committee on Children and Disasters. (2018). [Funding Strategies Report](#).

This report discusses “best practices and recommendations to improve the funding environment for pediatric disaster preparedness.” The authors advocate for pediatric preparedness to be incentivized with funding; for dedicated research funds to be

allocated; for additional research on the use of medical countermeasures in children; and for the federal government to determine return on investment for funds spent on pediatric preparedness to date.

Petinaux, B. (2009). [Financial Burden of Emergency Preparedness on an Urban, Academic Hospital](#). (NOTE: Refer to attachment for full text article.) *Prehospital Disaster Medicine*. 24(5):372-375.

This study describes findings from a survey conducted with 40 hospital Emergency Management Committee members to determine the human resource costs of a hospital's emergency preparedness planning in 2005. Activities included personal education/training, educating others, equipment maintenance/paperwork, meeting attendance, and drill participation. After computing hourly salaries, the author found that direct personal costs spent on emergency preparedness activities at the institution totaled \$232,417.

Smit, M., Rasinski, K., Braun, B., et al. (2017). [Ebola Preparedness Resources for Acute-Care Hospitals in the United States: A Cross-Sectional Study of Costs, Benefits, and Challenges](#). (NOTE: Refer to attachment for full text article.) *Infection Control & Hospital Epidemiology*. 38(4): 405-410.

The authors conducted a national survey of hospitals to assess resource allocation and costs associated with Ebola preparedness related to the 2014-2015 outbreak. Small hospitals were found to spend nearly three times more money on staff overtime costs than larger hospitals. The overall cost for acute care hospitals to prepare for patients with Ebola was estimated at \$361,000 and the primary preparedness challenge participants listed was securing supplies due to shortages. The authors emphasized the need for more substantial regional and national planning to ensure better resource allocation.

U.S. Department of Health and Human Services, Office of the Assistant Secretary for Preparedness and Response. (2018). [ASPR Healthcare System Recovery Guide: Hurricane Harvey](#).

This document highlights common post-disaster recovery planning challenges for small and medium-sized healthcare facilities; shares strategies for short- and long-term recovery; and identifies support resources. Information is presented in four categories: financial and legal; operational planning; workforce; and training and testing. **NOTE:** The Financial and Legal Recovery Issues section begins on page. 3.